

REMARKS

Claims 1 through 52 are currently pending in the application upon entry of this amendment.

Claims 1 through 42 stand rejected.

Claims 1, 3, 10, 13, 17, 22, 24, 31, 34 and 38 have been amended.

Claims 43 through 52 have been newly added.

35 U.S.C. § 103 Rejection

Obviousness Rejection Based on U.S. Patent 5,629,539 to Aoki et al. in view of U.S. Patent 5,545,592 to Iacononi

Claims 1 through 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Aoki et al. (U.S. Patent 5,629,539) in view of Iacononi (U.S. Patent 5,545,592).

Applicants submit that in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure.

Applicants respectfully submit that a *prima facie* case of obviousness under 35 U.S.C. § 103 has not been established regarding the claimed invention. First, there is no suggestion in either of the references or in the knowledge available to one skilled in the art to substitute the titanium (150) and titanium nitride (160) layers of Iacononi for the pad electrode (21a) of Aoki to arrive at Applicants' invention as per the claims as amended. In fact, Aoki teaches away from such a combination. Aoki cuts production steps by forming the pad electrode at the same time and out of the same material as the adjacent electrodes ("cylindrical storage node electrodes"). Col 7, lines 43-47. Note the identical shadings of both types of electrodes in Figure 1b. If Aoki's pad electrode were to be exchanged for the two layers of Iacononi, the fabricator

following directions for creating the DRAM in Figure 1b would have to do one of two things: either follow the method of Aoki only up to and including the formation of the electrodes, and subsequently perform a mechanical or chemical elimination of the pad electrode; or greatly alter Aoki's simple fabrication scheme, in order to avoid forming the pad electrode in the first place. Thus, Applicants submit that one of ordinary skill in the art who reads Aoki's disclosure is forced to resort to the distortion of Aoki's simple procedure in order to accommodate the substitution of Iacoponi's layers for Aoki's pad electrode. Expressed differently, the visual substitution based on Figure 1b of Aoki and Figure 7 of Iacoponi is not nearly straightforward as it may seem at first glance. One of ordinary skill in the art who takes advantage of the simplicity of procedure accompanying Aoki's figures will find that Aoki's disclosure does not teach or suggest the proposed substitution, and that Aoki's recommended procedure, far from embracing the substitution, in fact does not accommodate it. For these reasons, Aoki teaches away from the substitution.

Furthermore, the combination of prior art does not teach or suggest all of the claim limitations of the claims as amended. Applicants' process addresses a problem in the semiconductor manufacturing industry: how to create a DRAM, having the space-saving, high aspect ratio configuration required by modern electronics, which also has the high amount of titanium/titanium nitride contact coverage required by the space economical "self-aligned" contacts incorporated into such DRAMs. Specification, paragraphs [0006] through [0009]. More specifically, with higher aspect ratios, the required titanium cannot be evenly applied at an appreciable rate with conventional methods such as sputtering. Only Chemical vapor gives suitable results. Specification, paragraph [0010].

Applicants have thus amended claims 1, 3, 10, 13, 17, 22, 24, 31, 34 and 38 to include the limitation "an aspect ratio of at least about 2.5." Ample support for the addition of this material to the claims can be found in Applicants' specification in paragraphs 6 through 9. Neither reference, let alone their combination, explicitly or implicitly teaches such a DRAM or device. Neither reference even discloses general information about the aspect ratios of the devices taught. Only Iacoponi teaches the deposition of titanium/titanium nitride layers by chemical vapor deposition. However, Iacoponi does not even discuss or allude to the inclusion of stacked

capacitors in a DRAM, which is the reason aspect ratios are so high in modern DRAMs. Thus Iacoponi does not and cannot clearly contemplate a high aspect ratio situation, and its combination with Aoki cannot be interpreted to contain Applicants' high aspect ratio limitation.

On page 4 of the Office Action it is stated that "with respect to the limitations of the CVD titanium a 'product by process claim' is directed to the product per se, no matter how actually made." As elucidated in Applicants' specification in paragraph, at high aspect ratios, CVD gives a titanium layer of a different structure than other conventional deposition methods. Specification paragraph 10. Thus, the specification of CVD titanium and high aspect ratio is a structural constraint, not merely another way to make a product which could be produced identically by other processes.

On page 5 of the Office Action it is stated that "the processes for making Aoki and Iacoponi device may differ from each other, but such differences are irrelevant because the Applicants' claims are directed to a semiconductor device." However, the Supreme Court has established the standard of patentability to be applied in obviousness rejections in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). This standard has been summarized in MPEP § 2141 into four factual inquiries including "(A) determining of the scope and contents of the prior art; (B) ascertaining the differences between the prior art and the claims in issue; (C) resolving the level of ordinary skill in the pertinent art; and (D) evaluating evidence of secondary considerations." It should be noted that, when applying the required patentability standards of *Graham*, the basic considerations which apply to obviousness rejections based on 35 U.S.C. § 103 should include the following principles of patent law: "(A) the claimed invention must be considered as a whole; (B) *the references must be considered as a whole* (emphasis added) and must suggest the desirability and thus the obviousness of making the combination; (C) the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) reasonable expectation of success is the standard with which obviousness is determined." *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

A consideration of the references "*as a whole*," mandates against the "visual substitution" of elements from one source into another. In this case, doing so would require the

practitioner to reach outside the teachings of both references to develop a method, not immediately obvious to one skilled in the art, to fabricate the created hybrid concept.

Furthermore, the substitution entailed by the proposed combination of Aoki and Iacoponi violates point C) at the end of the preceding paragraph: “the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.” Applicants respectfully suggest that the selection of an element of Iacoponi (the titanium/titanium nitride layers) for substitution into the design and fabrication scheme taught by Aoki is clearly done with the benefit of knowledge gleaned from Applicants’ disclosure. Applicant respectfully submits that “impermissible hindsight” is especially indicated when a practitioner would be forced to find a fabrication method which is outside of and contrary to the teachings of the references.

Applicants thus respectfully submit that amended claims 1, 3, 10, 13, 17, 22, 24, 31, 34 and 38 are allowable, and claims 2, 4-9, 11, 12, 14-16, 18-21, 23, 25-30, 32, 33, 35-37, 39-42, are allowable as depending from allowable claims. Added claims 43 through 52 are also allowable as depending from allowable claims.

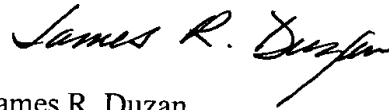
Applicants request entry of this amendment for the following reasons:

The amendment clearly places the application in condition for allowance.

The amendment does not require any further search.

In summary, Applicants request entry of this amendment, the allowance of claims 1 through 52, and the case passed for issue.

Respectfully submitted,



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